Soil Sampling Report
Silver Gate Ranches Lots 1 – 18

PARK CITY, UTAH

SEPTEMBER 26, 2017

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1.0 INTRODUCTION

This report presents the results of soil sampling conducted in May and June 2017 at the Pace Ranch property (the “Property”) in Park City, Summit County, Utah. This sampling effort was conducted to collect data to determine if the areas that Resort Center Associates ("RCA") proposes to develop within the Pace Ranch (the “Property”) lie "outside of the impacted area" of the Richardson Flat Tailings Site Lower Silver Creek ("Site") Operable Unit 2 (OU2) as defined in Section II.A.i of Summit County Ordinance No. 692. A map showing the boundaries of the approximately 152 acre Property and the boundaries of the proposed 18 lot Silver Gate Ranches development is attached as Figure 1. Figure 2 presents the lot outlines and other details of the proposed development plan.

As shown on Figure 1, the Property lies east and upgradient of the State of Utah Rail Trail and is located entirely outside of the Silver Creek floodplain. Historically, several irrigation ditches that carried water diverted from Silver Creek entered the Property’s southern boundary. The Property was originally part of a larger property, the Pace ranch, that extended into the floodplain of Silver Creek. The Pace ranch was established in 1861 and was operated as a dairy farm by the Pace family for over a century. The dairy operation ceased upon the sale to RCA. Since then it has been a cattle and horse operation. RCA discovered the concerns relating to mine tailings in the floodplain as a result of its pre-acquisition due diligence. As a result of that due diligence, all portions of the larger Pace Ranch located within the floodplain were subdivided and transmitted to Park City; RCA never took title to that portion of the ranch.

RCA has entered into a Development Agreement with Summit County that permits the development of 18 1+ acre lots on the south portion of the Property next to Promontory. The rest of the Property, including the only areas with any evidence of mine waste-related contamination, will be dedicated as permanent open space that will total over 100 acres and will adjoin the Utah Rail Trail, preserving the open space character of the Trail.

Although the Property was subdivided from all land in the floodplain, the Property was apparently included in EPA's designation of the boundaries of the Site because it was once a part of that larger property. The inclusion of the Property within the Site triggered Summit County Ordinance No. 692, delaying development for over a decade.

As summarized in SAGE’s 2016 letter to the Summit County Attorney (SAGE 2016), extensive soil sampling has been undertaken on the Property between 2007 and 2015 by Granite Environmental, Inc. (Granite 2007); Tetra Tech (2007); SAGE Environmental, L.L.C. (SAGE 2014) and United Park City Mines (UPCM 2016). In June 2017, RCA retained SAGE to conduct an extensive sampling effort on the proposed 18-lot development, the results of which are presented in this report.

2.0 METHODS

2.1 SOIL SAMPLE COLLECTION

Soil samples were collected using a mini-excavator to excavate test pits. Generally, three test pits were excavated per 2-acre lot: one in the approximate center of each lot (e.g., designated as Lot 3 Center or "L3C") to a depth of 9' below ground surface (bgs), and one each centered in the eastern and western halves of each lot (e.g., designated as L5E or L18W) that were excavated to an approximate depth of 1.5'. Two additional 1.5' test pits were excavated (one on Lot 14 [L14NW] and one on Lot 15 [L15S]) to collect additional samples for a background study. All test pits were sampled at depths of 0-2" and 6-12" (as per UPCM 2016), and the deep test pits in the center of each lot were also sampled at 4' and 9' bgs. A total of 163 samples were collected and analyzed, as summarized in Table 2.0-1, below:

Table 2.0-1. Sample summary.

	Sample Depth			
Sample ID	**0-2"**	**6-12"**	**4'**	**9'**
1C through 18 C	18	18	18	17*
1E through 18 E	18	18	--	--
1W through 18 W	18	18	--	--
14NE	1	1	--	--
15S	1	1	--	--
Duplicate samples	6	5	2	3
Total	**62**	**61**	**20**	**20**

* A 9' sample was not collected from Lot 7 because groundwater was encountered at 4.5'

The bucket of the excavator was used to remove surface vegetation, then a new wooden stake was used to collect the surface soil sample from a depth of 0-2". A new pair of disposable nitrile gloves was used to transfer the soil into a new, laboratory supplied 4-ounce glass jar. After the surface sample was collected, the test pit was excavated to a total depth of approximately 1.5', then a decontaminated plastic trowel was used to collect a sample from the sidewall of the test pit from a depth of 6-12" directly into a sample jar. The test pits located in the center of each 2-acre lot were further excavated to a total depth of 9' below ground surface (bgs), which corresponds to the depth that would typically be excavated to construct a residence with a basement. Samples were collected directly from the backhoe bucket from depths of 4' and 9' using a new pair of disposable nitrile gloves for each sample.

Following sample collection, the test pits were backfilled and bucket tamped in lifts. Test pit locations were recorded with a Garmin Oregon 450 handheld GPS and marked with a wooden stake. GPS coordinates for sampling locations are provided in Appendix C.

Duplicate soil samples were collected at the rate of 1 per 10 samples (10%).

The sample jars were labeled, placed in an iced cooler, and transferred under chain-of-custody to SAGE's sample refrigerator. Samples collected from the 0-2" depth interval were screened through a #10 sieve following UPCM protocols (UPCM 2016); samples from the other depth intervals were not sieved. Samples were stored at <6°C until delivered under chain-of-custody to American West Analytical Laboratories (AWAL) in Salt Lake City for analysis.

2.2 Laboratory Analytical Methods

The surface (0-2" depth interval) samples from the test pits located in the center of each lot were analyzed for total 8 RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium and silver using EPA Method 6020B and mercury using EPA Method 7471B). All other samples were analyzed only for total arsenic and lead using EPA Method 6020B.

3.0 RESULTS

3.1 Soil Sampling

Complete analytical results are presented in Appendix A, Table A-1, and laboratory analytical results reports are provided in Appendix B. Results are summarized in Table 3.0-1, below. EPA Regional Screening Levels (Master Summary Table, Residential Soil, June 2017) are included for comparison. Lead and arsenic concentrations are also shown on Figure 3 (samples from 0-2" and 6-12" depth intervals) and Figure 4 (samples from 4' and 9' depth intervals).

Table 3.0-1. Data Summary Table (all concentrations in mg/kg).

	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
USEPA RSLs	0.68	15,000	71	120,000	400	23	390	390
0-2" Depth Interval								
# of samples	62	20	20	20	62	20	20	20
Minimum	5.81	156.00	<0.937	25.10	17.40	<0.0374	<8.3	<1.54
Maximum	30.0	306.0	3.7	55.9	626	0.637	10.2	2.71
Mean	11.3	215.0	2.0	39.4	110.8	0.2	<9.3365	1.8
Mean + 2 SD	20.8	292.1	3.6	53.7	318.1	0.5	10.3	2.5
6-12" Depth Interval								
# of samples	61				61			
Minimum	3.74				11			
Maximum	32				531			
Mean	8.7				41.7			
Mean + 2 SD	19.1				182.5			
4' Depth Interval								
# of samples	20				20			
Minimum	<2.65				7.62			
Maximum	11.9				86.9			
Mean	4.8				15.9			
Mean + 2 SD	8.8				49.1			
9' Depth Interval								
# of samples	20				20			
Minimum	<2.45				6.36			
Maximum	13.7				172			
Mean	5.0				21.6			
Mean + 2 SD	10.8				95.6			

Red - Exceeds EPA Regional Screening Level for residential soil (June 2017).
Mean +2 SD – Mean plus 2 standard deviations.

Of the 20 soil samples analyzed for all 8 metals (the 0-2" depth interval from the center test pit on each of the 18 lots, plus 2 duplicates), only arsenic and lead exceeded their respective EPA Regional Screening Levels (RSLs). Based on this comparison, arsenic and lead are considered to be the only "contaminants of potential concern," and the other six metals are not evaluated further in this report.

As shown in Table 3.0-1, the upper 12" of soil had the highest arsenic and lead concentrations. The 0-2" depth interval had the highest mean concentrations of arsenic (11.3 mg/kg) and lead (110.8 mg/kg), with the 6-12" depth significantly lower (8.7 mg/kg arsenic and 41.7 mg/kg lead). The 4' and 9' depths had the lowest mean concentrations (arsenic 4.8 and 5.1 mg/kg and lead 15.9 and 21.6 mg/kg, respectively).

Of the 163 soil samples analyzed, all exceeded the EPA RSL for arsenic but only two samples exceeded the RSL for lead (Table 3.0-1). Elevated arsenic background concentrations are typical for the region and are further addressed in Section 3.2. Both of the samples that exceeded the lead RSL were from the test pit located on Lot 6 West (SGR-L6W): the 0-2" depth interval contained 626 mg/kg and the 6-12" interval contained 531 mg/kg lead (Figure 3). The next highest lead concentration reported was 301 mg/kg from SGR-L9W 0-2", which is only 75% of the RSL.

3.2 Background Study

Selected samples collected as a part of this sampling effort were used to conduct a background study. Under the assumption that irrigation with water diverted from Silver Creek was the primary mechanism by which soils on the Property would have become contaminated with arsenic and lead, samples collected from areas that had never been irrigated were used to estimate potential background concentrations. Based on field observations during the sampling, 10 locations were selected that either had no upgradient irrigation ditches (L8E, L14W, L14C, L14E, L14NE, L15W, L15C, L15E, and L15S) or were on a topographic high (L10W, L10C, and L10E) and would not have received irrigation flows. Arsenic and lead concentrations for the 14 background samples (12 locations and 2 duplicate samples) for the 0-2" and 6-12" depth intervals are shown in Table 3.0-2, below and on Figure 3.

Table 3.0-2. Arsenic and Lead Background Study

	Arsenic (mg/kg)		Lead (mg/kg)	
Sample Location	**0-2"**	**6-12"**	**0-2"**	**6-12"**
SGR-L8E	10.0	6.18	36.6	12.5
SGR-L10C	7.68	5.24	48.3	16.1
SGR-L10E	6.80	4.84	28.2	12.8
SGR-L10W	7.82	6.18	53.2	23.1
SGR-L14C	6.93	7.50	30.1	27.9
SGR-L14E	8.34	7.29	31.2	15.6
SGR-L14W	8.33	7.42	21.5	20.7
SGR-L21E*	*8.28*	*6.83*	*24.4*	*14.0*
SGR-L14NE	5.91	6.39	19.6	15.0
SGR-L15C	6.14	5.64	27.0	15.3
SGR-L15E	6.40	4.94	31.6	14.9
SGR-L15W	6.50	5.76	33.1	14.6
SGR-L15S	6.05	6.16	20.8	20.4
SGR-L22S*	*5.81*	NS	20.1	NS
Minimum	5.81	4.84	19.60	12.50
Maximum	**10.00**	**7.50**	**53.20**	**27.90**
Mean	**7.2**	**6.2**	**30.4**	**17.1**
Mean + 2 SD	**9.6**	**7.9**	**49.9**	**25.9**
USEPA RSLs	**0.68**		**400**	

Red - Exceeds EPA Regional Screening Level (June 2017)

* - duplicate of above sample

NS - Not sampled.

Mean +2 SD – Mean plus 2 standard deviations.

Mean arsenic background concentrations were 7.2 mg/kg in the 0-2" interval and 6.2 mg/kg in the 6-12" depth interval. Mean background lead concentrations were 30.4 mg/kg in the 0-2" interval and 17.1 mg/kg in the 6-12" depth interval. Mean background arsenic concentrations in both depth intervals were approximately ten times the RSL, while mean background lead concentrations were less than 10% of the RSL.

3.3 Quality Assurance

In general, there was good correlation between duplicate soil samples. Relative percent difference between duplicate samples was calculated for lead and arsenic because they were the only analytes that exceeded their screening levels (Appendix C, Table C-1). A typical target RPD for soil samples is 35%. RPDs for arsenic ranged from 0 to 26.5 with a mean of 6.2, and lead RPDs ranged from 0.8 to 44.8 with a mean of 14.2. Two of the 16 duplicate pairs, both from the 6-12" depth interval, exceeded an RPD of 35% for lead (at 38.6 and 44.8%). This is likely due to heterogeneity of the soil matrix since only the 0-2" depth interval was screened prior to analysis.

4.0 DISCUSSION AND CONCLUSIONS

Results of this study indicate that of the metals analyzed, arsenic and lead are the only contaminants of potential concern. Concentrations of barium, cadmium, chromium, mercury, selenium and silver in samples from the upper foot of soil were all well below their respective EPA RSLs for a residential exposure scenario.

4.1 ARSENIC

All soil samples collected contained arsenic concentrations that significantly exceeded the EPA RSL of 0.68 mg/kg. Concentrations ranged from the laboratory reporting limit of <2.45 mg/kg to 32 mg/kg with an overall mean of 8.7 mg/kg (Appendix A, Table A-1). These results were similar to those found in prior studies. Tetra Tech collected soil samples from the 0-6" depth interval from within the area of the proposed 18 lot development that had a mean arsenic concentration of 8.14 mg/kg (12 samples; maximum was 13.9 mg/kg) (UPCM 2014). Samples collected by Granite Environmental (Granite 2007) from the 0-6" layer of the southern and western borders of the Silver Gate Ranches property averaged 10.9 mg/kg arsenic (32 samples; maximum was 39 mg/kg).

4.2 LEAD

Only two of the 163 samples exceeded the 400 mg/kg EPA RSL for lead, and both were collected from the same test pit (L6W), indicating that lead concentrations are generally not of concern over the area of the proposed 18 lot development. These two samples contained 531 and 626 mg/kg lead, and so were only moderately higher than the residential soil RSL. This test pit was located approximately 60' downgradient of an irrigation ditch, but was located in a low spot where irrigation water may have ponded.

4.3 BACKGROUND ARSENIC AND LEAD

Soils in the Intermountain West in general and the Park City area in particular are known to have naturally high arsenic concentrations. Shacklette and Boerngen reported a mean arsenic concentration of 5.5 parts per million (ppm; equivalent to mg/kg) in the Western United States, with higher concentrations in the vicinity of the Park City, Utah (Shacklette and Boerngen 1984, Table 2 and Figure 4, respectively). Background concentrations for arsenic in soils at 12 CERLCA sites in the Salt Lake valley had a mean concentration of 13.83 mg/kg (UDEH 1991).

The results of this study suggest that the elevated background concentrations on the Property may be due to a combination of naturally occurring as well as anthropogenic sources since arsenic and lead concentrations in background samples collected from 0-2" are higher than in samples collected from 6-12" (Table 3.0-2). Air deposition may contribute to the higher surface concentrations of both arsenic and lead.

The mean arsenic concentrations in soil from the 0-2" (11.3 mg/kg) and 6-12" (8.7 mg/kg) depth intervals are slightly elevated relative to the background concentrations for each interval (7.2 and 6.2 mg/kg, respectively). The elevated concentrations of arsenic observed are likely due to the effects of former irrigation of this area of the Property using water diverted from Silver Creek containing contaminated sediment. Although both significantly exceed the RSL, soil arsenic concentrations reported in this and earlier studies (Granite 2007, Tetra Tech 2008) of the proposed development area are much lower than arsenic action levels developed for remediating other mining waste-contaminated sites in Utah, as discussed below in Section 4.4.

Similarly, the mean lead concentrations in soil from the 0-2" (110.8 mg/kg) and 6-12" (41.7 mg/kg) depth intervals are elevated relative to the background concentrations for each interval (30.4 and 17.1 mg/kg, respectively), again likely due to past irrigation with Silver Creek water containing entrained tailings. However, they are significantly below the RSL of 400 mg/kg as well as lead action levels for similar sites (see Section 4.4). A single location exceeded the RSL in both the 0-2" and 6-12" sample.

4.4 Comparison to Action Levels from Other Utah Sites

Mean arsenic and lead concentrations in surface and subsurface soils at the Silver Gate Ranches proposed residential development appear to be slightly elevated compared to site specific background, and every sample exceeded the RSL for arsenic. Soil arsenic and lead concentrations from Silver Gate Ranches were compared to site specific cleanup levels developed for recent remediation activities conducted under Federal and State oversight at other mine waste impacted residential sites in Utah. Action levels from three Utah sites are discussed below:

Silver Creek Village VCP Site, Park City, Utah - The proposed Silver Creek Village received a Certificate of Completion 2014 from the Utah Division of Environmental Response and Remediation Voluntary Cleanup Program (VCP) with US EPA Region 8 concurrence. This site is an approximately 240 acre proposed residential/commercial development located at the northeast corner of the intersection of I-80 and U.S.-40 in Park City. UT. Soil on a 5 acre portion of the site was located within the Soil Overlay Zone and was found to have been impacted by arsenic and lead from past irrigation using water diverted from Silver Creek. Action levels for remediation were adopted from the Lower Silver Creek OU 1 screening levels (500 mg/kg lead and 100 mg/kg arsenic). Soil exceeding the screening level for lead was excavated and disposed of off-site at the Richardson Flat Repository; no soil exceeded the screening level for arsenic (SAGE 2013). No samples on the Silver Gate Ranches proposed subdivision exceeded the 100 mg/kg arsenic action level utilized for the Silver Creek Village site and only one sampling location in Lot 6 exceeded the lead action level utilized for that site.

Jacobs Smelter Superfund Site, Stockton, Utah – The Jacobs Smelter operated in the late 1800s and resulted in arsenic and lead contamination in site soils. In 2014, the Feasibility Study for Operable Unit 2 of the Jacobs Smelter site (URS 2014) identified Remediation Action Objectives for residential areas of the site which included preventing ingestion of arsenic-contaminated soils in excess of 100 mg/kg arsenic in surface and subsurface soil (0-12 inches below ground surface [bgs]) and of lead-contaminated soils in excess of 500 mg/kg in surface soils (0-2 inches bgs) and 800 mg/kg in sub-surface soils (2 to 12 inches bgs). No area on the Silver Gate Ranches proposed subdivision exceeded the 100 mg/kg arsenic action level applied at the Jacobs Smelter site and only the single sampling location in Lot 6 exceeded the lead action level utilized for that site.

Kennecott South Zone Superfund Site, Salt Lake County, Utah – A five-year review was completed on May 6, 2016 to evaluate whether the remedies selected in the Record of Decisions (RODs) remained protective of human health and the environment (UDEQ/EPA Region 8 2016). According to the five-year review report, the arsenic action level of 100 mg/kg that had been established for residential land use was reviewed and determined to be still generally acceptable to ensure protectiveness for public health and the environment. Lead action levels for residential sites varied from 700 to 1200 mg/kg were also still determined to be protective. No samples from the Silver Gate Ranches proposed subdivision exceeded either the arsenic or lead residential standards developed for the Kennecott site.

4.5 Conclusions

Arsenic and lead concentrations in samples collected from the upper foot of soil on the proposed 18 lot development area are elevated when compared to site-specific background concentrations. Although all samples exceeded the EPA RSL for arsenic, even the site-specific background arsenic concentrations exceed the RSL and are likely due to a combination of natural and anthropogenic factors. Only two of the samples exceeded the RSL for lead.

When compared to recent Federal and State-approved remedial action levels for three other mining-impacted sites in Utah, all of the 163 samples analyzed from the Silver Gate Ranch development are below the arsenic action level for residential exposures that was used at all three sites (100 mg/kg). Only two samples from one location exceeded the 500 mg/kg action level for lead for residential land use applied at the Silver Creek Village and Jacobs Smelter sites, and no samples exceeded the lead action levels applied at the Kennecott site (700 – 1200 mg/kg for residential land use). The maximum concentration of lead reported from Lot 6 (sample SGR-L6W-0-2") was only 25% greater than the lowest action level (500 mg/kg), and the mean concentration for the 0-2" depth interval over Lot 6 was 323 mg/kg. Since risk is based on average concentrations over an exposure area, Lot 6 should not pose an unacceptable risk to human health.

The results of extensive soil sampling conducted on the proposed 18 lot Silver Gate Ranch development indicate that while arsenic and lead concentrations are somewhat elevated relative to site-specific background concentrations, they are well below recent remedial action levels used at other similar mining-impacted sites in Utah. Based on this comparison, we conclude that the proposed development area lies "outside of the impacted area" of the Richardson Flat Tailings Site Lower Silver Creek OU2.

5.0 LIMITATIONS

SAGE has performed this soil sampling on the Property with the objective of determining if the soil had been impacted by mining wastes. This study and report was prepared in accordance with generally accepted professional consulting practices. No warranty, expressed or implied, is made regarding the findings and recommendations in this report.

6.0 REFERENCES

Granite. 2007a. *Pace Ranch Soil Sampling for RCRA Metals, Granite Project No. 0356-022.* Letter from Jack Elder to Walter Plumb III. Granite Environmental, Inc. May 24, 2007.

Granite. 2007b. *Results of Composite Sampling, Pace Ranch, Summit County, Utah, Granite Project No. 0356-022.* Letter from Jack Elder to Walter Plumb III. Granite Environmental, Inc. May 30, 2007.

Gustavsson, N., B. Bolviken, D. B. Smith, and R. C. Severson. 2001. *The Geochemical Landscapes of the Conterminous United States–New Map Presentation for 22 Elements.* US Geological Survey Professional Paper 1648.

SAGE. 2013. *Remedial Action Report, Parcel A-2, Silver Creek Village VCP Site #075.* SAGE Environmental, L.L.C. December 9, 2013.

SAGE. 2016. Letter to Jamie Brackin, Summit County Attorney from Laurie Goldner, SAGE Environmental, L.L.C. re: *Silver Gate Ranches Proposed Subdivision, Pace Ranch Property, Park City, UT*, December 2, 2016.

Shacklette, H. T. and J. G. Boerngen. 1984. *Element Concentration in Soils and Other Surficial Materials of the Conterminous United States*, US Geological Survey (USGS) Professional Paper 1270.

UDEH. 1991. Letter from Kent P. Gray, Director, Utah Bureau of Environmental Response and Remediation to John King, Tetra Tech. May 21, 1991.

UDEQ/EPA Region 8. 2016. *Five-Year Review Report, Kennecott South Zone Superfund Site, Salt Lake County, Utah.* April 2016.

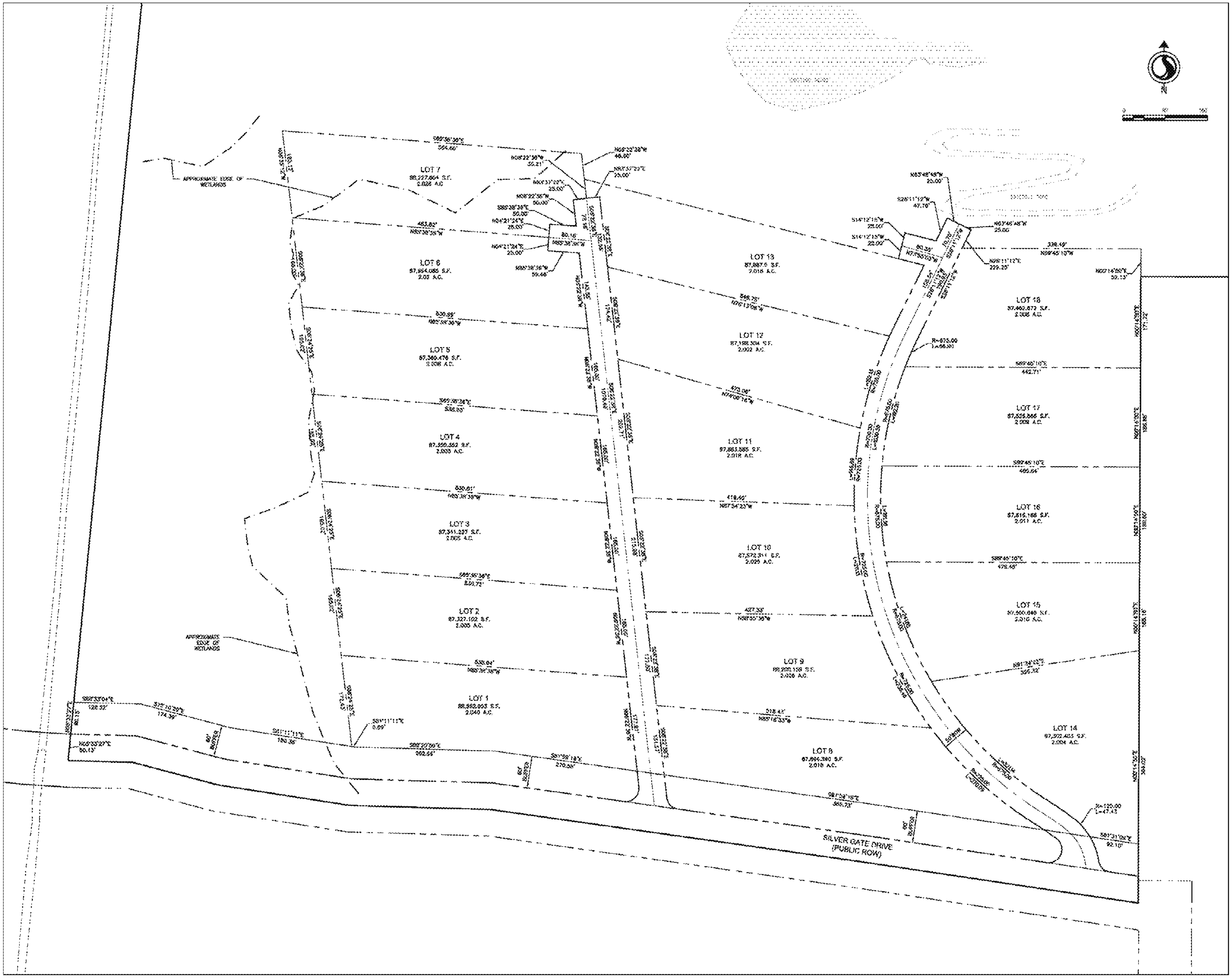
UPCM. 2014. *Tetra Tech figures 1A and 2A (dated January 18, 2008)* received from United Park City Mines, June 2014.

UPCM. 2016. *Draft Site Characterization Report, Engineering Evaluation/Cost Analysis, OU2 OU3 (Richardson Flat Tailings Site), Site ID: UT980952840.* United Park City Mines, August 10, 2016.

URS. 2014. *Jacobs Smelter Site, Operable Unit 2, Stockton, Utah, Final Updated Revised Feasibility Study Report.* Prepared for Utah Department of Environmental Quality, Division of Environmental Response and Remediation by URS Corporation. June 2014

Figures

Legend:	Proposed Development Area (Lots 1-18)	Silver Gate Ranches Property Boundary	**Resort Center Associates** Silver Gate Ranches Lots 1-18	**Figure 1** **Property and Vicinity**	SAGE environmental



Legend:

Proposed Development Area (Lots 1-18)

Resort Center Associates
Silver Gate Ranches
Lots 1-18

Figure 2

Proposed Development Plan

SAGE

Legend

Lot Boundaries

Sample Location ○

Background Sample △

L1W Sample ID (e.g., Lot 1 West)

Pb Lead in mg/kg

As Arsenic in mg/kg

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Shallow Soil Sampling Results
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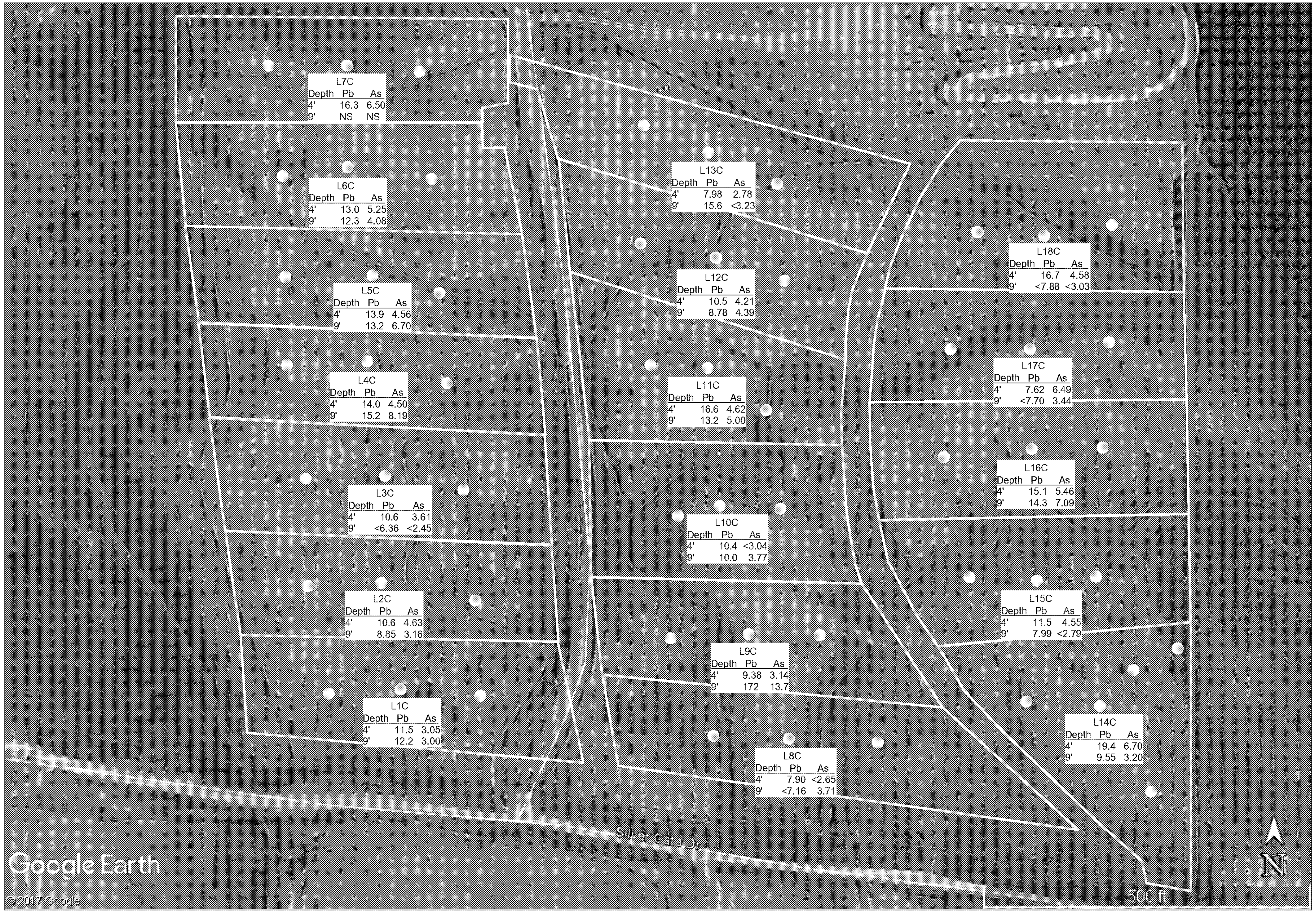
FIGURE 3



Legend

Lot Boundaries

Sample Location ○

L1W	Sample ID (e.g., Lot 1 West)
Pb	Lead in mg/kg
As	Arsenic in mg/kg

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Deep Soil Sampling Results May / June 2017

FIGURE 4

Appendix A

Table A-1. Silver Gate Ranch Soil Sampling Results, May-June 2017

Table A-1. Silver Gate Ranches Soil Sampling Results, May-June 2017 (all concentrations in mg/kg).

Sample ID	Date	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
EPA RSLs		0.68	15,000	71	120,000	400	23	390	390
SGR-L1C-0-2"	5/24/2017	**5.88**	**179**	**1.15**	**32.0**	**40.4**	**0.0491**	< 9.47	< 1.67
SGR-L1C-6-12"	5/24/2017	**5.77**				**32.1**			
SGR-L1C-4'	5/24/2017	**3.05**				**11.5**			
SGR-L1C-9'	5/24/2017	**3.00**				**12.2**			
SGR-L1E-0-2"	6/6/2017	**7.50**				**46.1**			
SGR-L1E-6-12"	6/6/2017	**6.26**				**31.0**			
SGR-L1W-0-2"	42892.00	**6.15**				**40.5**			
SGR-L1W-6-12"	6/6/2017	**5.10**				**24.2**			
SGR-L2C-0-2"	5/24/2017	**8.96**	**156**	**2.13**	**33.1**	**136**	**0.299**	< 8.70	< 1.54
SGR-L2C-6-12"	5/24/2017	**5.06**				**13.1**			
SGR-L2C-4'	5/24/2017	**4.63**				**10.6**			
SGR-L2C-9'	5/24/2017	**3.16**				**8.85**			
SGR-L2E-0-2"	6/6/2017	**12.2**				**178**			
SGR-L2E-6-12"	6/6/2017	**9.78**				**44.5**			
SGR-L2W-0-2"	42892.00	**7.26**				**42.6**			
SGR-L2W-6-12"	6/6/2017	**6.86**				**38.9**			
SGR-L3C-0-2"	5/24/2017	**14.3**	**185**	**2.68**	**38.5**	**238**	**0.637**	< 9.30	**2.48**
SGR-L3C-6-12"	5/24/2017	**5.21**				**29.9**			
SGR-L3C-4'	5/24/2017	**3.61**				**10.6**			
SGR-L19C-4'*	*5/24/2017*	***3.37***				***8.74***			
SGR-L3C-9'	5/24/2017	< 2.45				< 6.36			
SGR-L3E-0-2"	6/6/2017	**11.7**				**155**			
SGR-L3E-6-12"	6/6/2017	**7.41**				**21.6**			
SGR-L3W-0-2"	42892.00	**7.07**				**48.4**			
SGR-L3W-6-12"	6/6/2017	**6.38**				**15.9**			
SGR-L4C-0-2"	5/24/2017	**7.67**	**176**	**1.21**	**33.4**	**47.9**	**0.0646**	< 9.74	< 1.72
SGR-L4C-6-12	5/24/2017	**7.60**				**35.2**			
SGR-L4C-4'	5/24/2017	**4.50**				**14.0**			
SGR-L4C-9'	5/24/2017	**8.19**				**15.2**			
SGR-L4E-0-2"	6/6/2017	**10.2**				**77.0**			
SGR-L4E-6-12"	6/6/2017	**8.49**				**35.9**			
SGR-L4W-0-2"	6/6/2017	**8.14**				**43.6**			
SGR-L22W-0-2"*	*6/6/2017*	***7.88***				***44.7***			
SGR-L4W-6-12"	6/6/2017	**5.52**				**20.1**			
SGR-L22W-6-12"*	*6/6/2017*	***5.47***				***18.9***			
SGR-L5C-0-2"	5/24/2017	**17.4**	**208**	**3.27**	**51.4**	**258**	**0.504**	< 9.00	**2.48**
SGR-L5C-6-12"	5/24/2017	**13.1**				**169**			
SGR-L5C-4'	5/24/2017	**4.56**				**13.9**			
SGR-L5C-9'	5/24/2017	**6.70**				**13.2**			
SGR-L5E-0-2"	6/6/2017	**15.3**				**271**			
SGR-L5E-6-12"	6/6/2017	**10.4**				**64.0**			
SGR-L5W-0-2"	6/6/2017	**11.6**				**90.1**			
SGR-L22W-4'*	*6/6/2017*	***11.9***				***86.9***			
SGR-L5W-6-12"	6/6/2017	**11.2**				**58.1**			
SGR-L22W-9'*	*6/6/2017*	***11.1***				***70.8***			
SGR-L6C-0-2"	5/24/2017	**11.0**	**237**	**2.27**	**41.2**	**113**	**0.265**	< 10.1	< 1.79
SGR-L6C-6-12"	5/24/2017	**10.5**				**75.8**			
SGR-L19C-6-12"*	*5/24/2017*	***11.1***				***69.6***			
SGR-L6C-4'	5/24/2017	**5.25**				**13.0**			

Sample ID	Date	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
EPA RSLs		0.68	15,000	71	120,000	400	23	390	390
SGR-L6C-9'	5/24/2017	**4.08**				**12.3**			
SGR-L6E-0-2"	6/6/2017	**17.6**				**230**			
SGR-L6E-6-12"	6/6/2017	**11.7**				**85.4**			
SGR-L6W-0-2"	6/6/2017	**30.0**				**626**			
SGR-L6W-6-12"	6/6/2017	**29.6**				**531**			
SGR-L7C-0-2"	5/24/2017	**15.1**	**181**	**3.72**	**25.1**	**209**	**0.239**	< 8.30	**2.71**
SGR-L7C-6-12"	5/24/2017	**7.86**				**19.1**			
SGR-L7C-4'	5/24/2017	**6.50**				**16.3**			
SGR-L7E-0-2"	6/6/2017	**17.0**				**158**			
SGR-L7E-6-12"	6/6/2017	**9.04**				**27.1**			
SGR-L7W-0-2"	6/6/2017	**10.0**				**58.9**			
SGR-L7W-6-12"	6/6/2017	**7.86**				**20.3**			
SGR-L8C-0-2"	5/24/2017	**6.74**	**231**	< 0.987	**42.8**	**17.4**	**0.337**	< 9.87	< 1.74
SGR-L8C-6-12"	5/24/2017	**4.33**				**11.0**			
SGR-L8C-4'	5/24/2017	< 2.65				**7.90**			
SGR-L8C-9'	5/24/2017	**3.71**				< 7.16			
SGR-L8E-0-2"	5/25/2017	**10.0**				**36.6**			
SGR-L8E-6-12"	5/25/2017	**6.18**				**12.5**			
SGR-L8W-0-2"	42880.0	**13.7**				**200**			
SGR-L8W-6-12"	5/25/2017	**6.83**				**39.8**			
SGR-L9C-0-2"	5/24/2017	**9.62**	**175**	**2.01**	**40.7**	**87.1**	**0.189**	< 9.25	< 1.63
SGR-L9C-6-12"	5/24/2017	**3.74**				**11.3**			
SGR-L9C-4'	5/24/2017	**3.14**				**9.38**			
SGR-L9C-9'	5/24/2017	**13.7**				**172**			
SGR-L9E-0-2"	5/25/2017	**10.4**				**107**			
SGR-L9E-6-12"	5/25/2017	**6.85**				**36.1**			
SGR-L9W-0-2"	5/25/2017	**16.1**				**301**			
SGR-L9W-6-12"	5/25/2017	**4.04**				**17.4**			
SGR-L10C-0-2"	5/24/2017	**7.68**	**191**	**1.33**	**34.2**	**48.3**	**0.0967**	< 8.81	< 1.56
SGR-L10C-6-12"	5/24/2017	**5.24**				**16.1**			
SGR-L10C-4'	5/24/2017	< 3.04				**10.4**			
SGR-L10C-9'	5/24/2017	**3.77**				**10.0**			
SGR-L19C-9'*	*5/24/2017*	***3.38***				***9.92***			
SGR-L10E-0-2"	5/25/2017	**6.80**				**28.2**			
SGR-L10E-6-12"	5/25/2017	**4.84**				**12.8**			
SGR-L10W-0-2"	5/25/2017	**7.82**				**53.2**			
SGR-L10W-6-12"	5/25/2017	**6.18**				**23.1**			
SGR-L11C-0-2"	5/24/2017	**10.3**	**202**	**1.72**	**36.1**	**79.0**	**0.0997**	< 9.16	< 1.62
SGR-L11C-6-12"	5/24/2017	**5.96**				**17.8**			
SGR-L11C-4'	5/24/2017	**4.62**				**16.6**			
SGR-L11C-9'	5/24/2017	**5.00**				**13.2**			
SGR-L11E-0-2"	5/25/2017	**9.56**				**45.1**			
SGR-L11E-6-12"	5/25/2017	**11.9**				**17.5**			
SGR-L11W-0-2"	5/25/2017	**17.0**				**227**			
SGR-L11W-6-12"	5/25/2017	**10.5**				**69.2** [a]			
SGR-L12C-0-2"	5/24/2017	**18.8**	**223**	**2.78**	**42.2**	**196**	**0.222**	< 10.2	< 1.81
SGR-L19C-0-2"*	*5/24/2017*	***18.6***	***296***	***3.13***	***47.5***	***183***	***0.202***	*< 9.83*	*< 1.73*
SGR-L12C-6-12"	5/24/2017	**12.6**				**109**			
SGR-L12C-4'	5/24/2017	**4.21**				**10.5**			
SGR-L12C-9'	5/24/2017	**4.39**				**8.78**			

Sample ID	Date	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
EPA RSLs		0.68	15,000	71	120,000	400	23	390	390
SGR-L12E-0-2"	5/25/2017	15.4				135			
SGR-L12E-6-12"	5/25/2017	10.1				46.3			
SGR-L12W-0-2"	5/25/2017	13.0				93.0			
SGR-L12W-6-12"	5/25/2017	8.83				24.3			
SGR-L13C-0-2"	5/24/2017	11.8	202	1.53	43.0	74.6	0.0865	< 8.88	< 1.57
SGR-L13C-6-12"	5/24/2017	8.24				25.3			
SGR-L13C-4'	5/24/2017	2.78				7.98			
SGR-L13C-9'	5/24/2017	< 3.23				15.6			
SGR-L13E-0-2"	5/25/2017	19.3				251			
SGR-L21W-0-2"*	*5/25/2017*	*19.4*				*212*			
SGR-L13E-6-12"	5/25/2017	24.5				30.5			
SGR-L21W-6-12"*	*5/25/2017*	*32.0*				*48.1*			
SGR-L13W-0-2"	5/25/2017	12.9				86.1			
SGR-L13W-6-12"	5/25/2017	8.90				26.9			
SGR-L14C-0-2"	5/25/2017	6.93	208	< 0.937	30.2	30.1	< 0.0414	< 9.37	< 1.65
SGR-L14C-6-12	5/25/2017	7.50				27.9			
SGR-L14C-4'	5/25/2017	6.70				19.4			
SGR-L14C-9'	5/25/2017	3.20				9.55			
SGR-L20C-9'*	*5/25/2017*	*3.84*				*8.91*			
SGR-L14E-0-2"	5/25/2017	8.34				31.2			
SGR-L14E-6-12"	5/25/2017	7.29				15.6			
SGR-L14NE-0-2"	6/6/2017	5.91				19.6			
SGR-L14NE-6-12"	6/6/2017	6.39				15.0			
SGR-L14W-0-2"	5/25/2017	8.33				21.5			
SGR-L21E-0-2"*	*5/25/2017*	*8.28*				*24.4*			
SGR-L14W-6-12"	5/25/2017	7.42				20.7			
SGR-L21E-6-12"*	*5/25/2017*	*6.83*				*14.0*			
SGR-L15C-0-2"	5/25/2017	6.14	232	< 0.938	35.1	27.0	< 0.0374	< 9.38	< 1.66
SGR-L15C-6-12	5/25/2017	5.64				15.3			
SGR-L15C-4'	5/25/2017	4.55				11.5			
SGR-L15C-9'	5/25/2017	< 2.79				7.99			
SGR-L15E-0-2"	5/25/2017	6.40				31.6			
SGR-L15E-6-12"	5/25/2017	4.94				14.9			
SGR-L15S-0-2"	6/6/2017	6.05				20.8			
SGR-L22S-0-2"*	6/6/2017	5.81				20.1			
SGR-L15S-6-12"	6/6/2017	6.16				20.4			
SGR-L15W-0-2"	5/25/2017	6.50				33.1			
SGR-L15W-6-12"	5/25/2017	5.76				14.6			
SGR-L16C-0-2"	5/25/2017	11.60	225	2.50	40.7	124	0.212	< 9.62	< 1.70
SGR-L20C-0-2"*	*5/25/2017*	*11.6*	*220*	*2.42*	*42.5*	*107*	*0.163*	*< 9.15*	*< 1.61*
SGR-L16C-6-12"	5/25/2017	7.46				18.8			
SGR-L16C-4'	5/25/2017	5.46				15.1			
SGR-L16C-9'	5/25/2017	7.09				14.3			
SGR-L16E-0-2"	5/25/2017	10.2				60.0			
SGR-L16E-6-12"	5/25/2017	5.97				19.6			
SGR-L16W-0-2"	5/25/2017	8.11				62.3			
SGR-L16W-6-12"	5/25/2017	6.27				28.2			
SGR-L17C-0-2"	5/25/2017	11.0	267	1.94	55.9	84.7	0.164	< 9.30	< 1.64
SGR-L17C-6-12"	5/25/2017	7.87				17.8			
SGR-L17C-4'	5/25/2017	6.49				7.62			

Sample ID	Date	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
EPA RSLs		0.68	15,000	71	120,000	400	23	390	390
SGR-L17C-9'	5/25/2017	**3.44**				< 7.70			
SGR-L17E-0-2"	5/25/2017	**9.46**				**41.9**			
SGR-L17E-6-12"	5/25/2017	**6.54**				**14.8**			
SGR-L17W-0-2"	5/25/2017	**21.5**				**293**			
SGR-L17W-6-12"	5/25/2017	**9.28**				**60.4**			
SGR-L18C-0-2"	5/25/2017	**10.2**	**306**	**1.79**	**42.6**	**71.7**	**0.102**	< 9.30	< 1.64
SGR-L18C-6-12"	5/25/2017	**6.97**				**14.5**			
SGR-L20C-6-12"*	*5/25/2017*	***7.63***				***18.0***			
SGR-L18C-4'	5/25/2017	**4.58**				**16.7**			
SGR-L18C-9'	5/25/2017	< 3.03				< 7.88			
SGR-L18E-0-2"	5/25/2017	**7.17**				**18.0**			
SGR-L18E-6-12"	5/25/2017	**7.08**				**14.6**			
SGR-L18W-0-2"	5/25/2017	**15.4**				**137**			
SGR-L18W-6-12"	5/25/2017	**10.5**				**58.3** [a]			
Minimum		< 2.45	**156.00**	< 0.937	**25.10**	< 6.36	< 0.0374	< 8.30	< 1.54
Maximum		**32.00**	**306.00**	**3.72**	**55.90**	**626.00**	**0.64**	< 10.20	**2.71**
Mean		**8.7**	**215.0**	**2.0**	**39.4**	**62.1**	**0.2**	**9.3**	**1.8**

* - duplicate of above sample

< - Result is below the laboratory's reporting limit.

[a] Matrix spike recoveries and/or high RPDs indicate suspected sample non-homogeneity. The method is in control as indicated by the LCS.

Appendix B

Laboratory Analytical Results Reports

(on CD)

Appendix C

Table C-1. Arsenic and Lead Relative Percent Difference (RPD) for Duplicate Pairs

Table C-1. Arsenic and Lead Relative Percent Difference (RPD) for Duplicate Pairs.

Duplicate Pairs	Date	Arsenic (mg/kg)	Lead (mg/kg)	RPD Arsenic	RPD Lead
SGR-L3C-4'	5/24/2017	3.61	10.6	6.9	19.2
SGR-L19C-4'*	5/24/2017	3.37	8.74		
SGR-L4W-0-2"	6/6/2017	8.14	43.6	3.2	2.5
SGR-L22W-0-2"*	6/6/2017	7.88	44.7		
SGR-L4W-6-12"	6/6/2017	5.52	20.1	0.9	6.2
SGR-L22W-6-12"*	6/6/2017	5.47	18.9		
SGR-L5W-0-2"	6/6/2017	11.60	90.1	2.6	3.6
SGR-L22W-4'*	6/6/2017	11.9	86.9		
SGR-L5W-6-12"	6/6/2017	11.2	58.1	0.9	19.7
SGR-L22W-9'*	6/6/2017	11.1	70.8		
SGR-L6C-6-12"	5/24/2017	10.50	75.8	5.6	8.5
SGR-L19C-6-12"*	5/24/2017	11.1	69.6		
SGR-L10C-9'	5/24/2017	3.77	10.0	10.9	0.8
SGR-L19C-9'*	5/24/2017	3.38	9.92		
SGR-L12C-0-2"	5/24/2017	18.80	196	1.1	6.9
SGR-L19C-0-2"*	5/24/2017	18.6	183		
SGR-L13E-0-2"	5/25/2017	19.3	251	0.5	16.8
SGR-L21W-0-2"*	5/25/2017	19.4	212		
SGR-L13E-6-12"	5/25/2017	24.50	30.5	26.5	44.8
SGR-L21W-6-12"*	5/25/2017	32	48.1		
SGR-L14C-9'	5/25/2017	3.20	9.55	18.2	6.9
SGR-L20C-9'*	5/25/2017	3.84	8.91		
SGR-L14W-0-2"	5/25/2017	8.33	21.5	0.6	12.6
SGR-L21E-0-2"*	5/25/2017	8.28	24.4		
SGR-L14W-6-12"	5/25/2017	7.42	20.7	8.3	38.6
SGR-L21E-6-12"*	5/25/2017	6.83	14.0		
SGR-L15S-0-2"	6/6/2017	6.05	20.8	4.0	3.4
SGR-L22S-0-2"*	6/6/2017	5.81	20.1		
SGR-L16C-0-2"	5/25/2017	11.6	124	0.0	14.7
SGR-L20C-0-2"*	5/25/2017	11.6	107		
SGR-L18C-6-12"	5/25/2017	6.97	14.5	9.0	21.5
SGR-L20C-6-12"*	5/25/2017	7.63	18		
Mean RPD				**6.2**	**14.2**

* = duplicate of above sample